

BWDK-T 系列

BWDK-T Series of

干式变压器温度控制箱

Dry-type Transformer Temperature Controller

使用说明书

Operation Instructions



南京圣尚科技有限公司

Nanjing Shengshang Science & Technology Co., Ltd.

警告：主体变压器做高压绝缘实验时，请断开与本温控箱间的联线，以确保温控箱安全。

Warning: When conduct the high-voltage insulation test to the main body of transformer, please disconnect it from the temperature controller so as to ensure the safety of the temperature controller.

一、概述 Outline

BWDK-T 系列干式变压器温度控制箱是由微处理器构成的智能仪器，它使用三只铂电阻作传感器，测量干式变压器三相绕组的温度。根据设定的温度值，启停风机进行温度控制。仪器具有各种声光报警功能，是保护干式变压器的重要装置。

BWDK-T series of dry-type transformer temperature controller is an intelligent instrument equipped with a microprocessor. It uses three platinum resistances as sensors to measure the temperature of three-phase windings of the dry-type transformer, and start and stop the fan for temperature control according to preset temperature value. With various sound and light alarm functions, the instrument is an important device for protecting the dry-type transformer.

仪器符合 JB/T7631-2016 标准。The instrument complies with Standard JB/T7631-2016.

仪器具有以下特点： The instrument has features as follows:

1. 仪器可以测量干式变压器三相绕组的温度，用 LED 每隔 4 秒循环显示三相温度值或定点点显示三相温度最大值。

It is capable of measuring the temperature of three-phase windings of the dry-type transformer, displaying in turn three-phase temperature values with a LED every 4 seconds or displaying the highest three-phase temperature periodically.

2. 仪器可以用按键输入 4 种温度设定值。当测量温度超过各设定值时，分别控制风机启停、超温报警、超高温跳闸等。温度设定值可以随时修改，断电后不会消失。

Four preset temperature values can be input by keystroke. When the measured temperature exceeds preset values, the instrument will respectively control startup and stop of the fan, over-temperature alarm, ultra-high temperature trip, etc. The preset temperature values can be modified at any time, and will remain after the instrument is switched-off.

3. 仪器具有传感器断线故障检测功能。

The instrument is capable of detecting the broken-line fault of the sensor.

4. 仪器具有风机依设定温度自动定时启动和手动启动功能。仪器可设定 1-250 小时内自动启动风机 1 分钟。

The instrument has the function of automatic timing startup and manual startup according to the preset temperature, and can set automatic fan startup for 1 minute within 1-250 hours.

5. 仪器具有温度历史最大值记录功能，黑匣子功能。

The instrument is capable of remembering the highest temperature ever occurred. Black box function

二、技术特性 Technical specifications

1. 仪器工作环境温度：-25~+55℃。

Conditions for continuous operation of the instrument Temperature: -25~+55℃。

2. 工作电源：AC220V (1±10%)；频率 50Hz±0.5Hz。仪表保护装置 5A 熔丝。

Working power supply: AC220V(1±10%), frequency 50Hz±0.5Hz. 5A fuse for the instrument protector.

3. 温度测量范围：-30~+240℃, -20~+200℃。

Temperature measurement range: -30~+240℃, -20~+200℃。

4. 温度测量准确度：0.5 级。

Temperature measurement precision: Class 0.5.

5. 显示方式：LED 每隔 4 秒循环显示 A、B、C 三相温度或定点显示三相温度的最大值，分辨率 0.1℃。

Display mode: A LED displays temperature of Phase A, B and C in turn every 4 seconds, or displays the highest three-phase temperature periodically, with resolution being 0.1℃.

6. 输出方式：输出报警、跳闸和传感器故障，继电器接点容量 AC250V/5A。

Output mode: Output alarm, trip and sensor fault. Relay contact capacity is AC250V/5A.

7. 启动风机：控制 4~6 台风机，继电器接点总容量 AC250V/10A。

Fan startup: Control 4-6 fans, and total relay contact capacity is AC250V/10A.

8. 耐压实验：2500VAC、60Hz、60 秒。

Withstanding-voltage test: 2500VAC, 60Hz and 60 seconds.

9. 外形尺寸：260 (H) ×200 (W) ×90 (D) mm³。

Dimensions: 260 (H) ×200 (W) ×90 (D) mm³.

10. 开孔尺寸：232 (H) ×182 (W) mm²

Perforate dimensions: 232 (H) ×182 (W) mm².

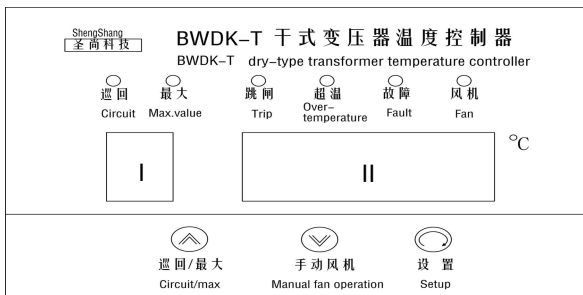
11. 模拟量输出：三路 4-20mA，对应 A、B、C 相温度 0-200℃，或一路 4-20mA 对应 A、B、C 相中最大值温度 0-200℃，精度 1%±1 个字，负载电阻≤600Ω。

Analog output: Three-line 4-20mA output corresponds with temperature of Phase A, B and C (0-200℃), or one-line 4-20mA output corresponds with the highest temperature of 0-200℃ among Phase A, B and C. Precision is within 1%±1 and load resistance is ≤600Ω.

12. 数字量输出：RS232 或 RS485 串行通讯接口，采用 Modbus 通讯协议。

Digital output: RS232 or RS 485 serial communication interface, with Modbus Communication Protocol being adopted.

三、仪器结构 Instrument structure



前面板上有两组数码管，I 数码管显示 A、B、C，II 数码管显示对应的该相温度。面板上排共 6 个指示灯。当“巡回”指示灯亮时，表示仪器巡回显示三相温度；当“最大值”指示灯亮时，表示仪器显示当前最大值温度及其对应相。“跳闸”、“超温”、“故障”、“风机”指示灯分别指示跳闸、超温、故障、风机的状态。

There are two groups of digital tubes on the front panel, with Digital Tube I displaying character A, B or C, and Digital Tube II displaying corresponding phase temperature. There are totally 6 indicator lights above the LED. When the “Circuit” light is on, it indicates the instrument displays three-phase temperature in turn. When the “Max. value” light is on, it indicates that the instrument displays the current highest temperature and its corresponding phase. Lights of “Trip”, “Over-temperature”, “Fault” and “Fan” respectively indicate the status of trip, over-temperature, fault and fan.

四、输出控制动作说明 Description of output control action

仪器测量出变压器三相绕组的温度，求出其中的最大值 C_{max} ，将最大值与四种温度设定值 C_1 ， C_2 ， C_3 ， C_4 相比较然后控制风机启停、超温报警、超高温跳闸等动作。 C_1 ， C_2 ， C_3 ， C_4 的定义及出厂设定值见表

After the instrument measures the temperature of three-phase windings of the transformer, calculate the maximum C_{max} among them, and compare the maximum value with the four preset value of C_1 ， C_2 ， C_3 and C_4 before controlling the startup and stop of fan, over-temperature alarm, ultra-high temperature trip and other actions. The definitions of C_1 ， C_2 ， C_3 and C_4 as well as ex-work preset values are shown in Table

C_1 ， C_2 ， C_3 ， C_4 的定义及出厂设定值

Definitions of C_1 ， C_2 ， C_3 and C_4 and Ex-work Preset Values

	C_1	C_2	C_3	C_4
定义 Definition	风机停温度 Temperature for fan stop	风机开温度 Temperature for fan startup	超温报警温度 Temperature for over- temperature alarm	超温跳闸温度 Temperature for over- temperature trip
出厂值℃ Factory	80	100	130	150

五、基本功能使用方法 Operation methods of basic functions

接通仪器电源后，巡回显示三相绕组的温度，同时根据测量结果输出各种控制信号。

After the instrument is energized, temperature of three-phase windings is displayed in turn. In the meantime, various control signals are output in accordance with measurement results.

2. 按键的定义和功能

Definitions & functions of keystrokes

∧：加 1 键，每按一次，输入参数加 1，继续按下时，输入参数连续加 1。测量时为巡回显示与最大值显示的转换键。

∧： Adding 1 key. Every time you press this key, the input parameter value adds 1. If you keep the key pressed, the input parameter value will continuously increase by 1. It acts as a switch key between circuit display and maximum value display in time of measurement.

∨：减 1 键，每按一次，输入参数减 1，继续按下时，输入参数连续减 1。测量时当三相最大值温度小于 C_2 时，按下此键，手动打开或关闭风机。

∨： Subtracting 1 key. Every time you press this key, the input parameter value subtracts 1. If you keep the key pressed, the input parameter value will continuously decrease by 1. When the highest temperature of three-phase is less than C_2 in time of measurement, press this key to manually turn on or turn off the fan.

↔：输入转换键，每按一次，进入下一个参数的检查和修改。测量时按下此键，进入监控状态。

↔： Input switch key. Every time you press this key, you can enter the examination and modification of next parameter. Press this key to enter into monitoring status in time of measurement.

3. 检查参数的方法（操作流程图）

Methods for parameter examination (See Operation Flowchart)

仪器的基本参数共有 8 个。提示符分别为 C_1 、 C_2 、 C_3 、 C_4 、Ft、Ht、Ad、Bp。

The instrument has totally 8 basic parameters, with indication symbols being C_1 , C_2 , C_3 , C_4 , Ft, Ht, Ad and Bp respectively.

C_1 、 C_2 、 C_3 、 C_4 的定义见表，Ft 为风机定期检测的时间间隔，单位为小时，最大值为 250 小时，每次开启风机时间约 1 分钟，若设置为 0 则无此功能；Ht 为所测量三相温度的历史最大值。Ad 为通讯地址提示符，Bp 为通讯波特率。

Definitions of C_1 , C_2 , C_3 and C_4 are shown in Table . Ft represents the interval of periodic examination of the fan, with unit being an hour and the max. value being 250 hours. Time for fan startup is about 1 minute, and the function will not exist if 0 is set. Ht is the max. historical value measured for the three-phase temperature. Ad is an indication symbol of communication address and Bp is communication baud rate.

检查参数的具体方法 Specific methods for examining parameters

仪器通电显示版本号 SS03 后立即进入测量状态，此时连续按下 ↔ 键，则按 C_1 、 C_2 、 C_3 、 C_4 、Ft、Ht、Ad、Bp 的顺序显示各个参数的设定值。

After the version no. S503 is displayed following electrification, the instrument immediately enters the measuring state. At this time, press Key \leftrightarrow continuously, the preset values of various parameters will be displayed in the order of C₁, C₂, C₃, C₄, Ft, Ht, Ad and Bp.

这些参数值只能检查不能修改。当持续 5 秒未有键按下，自动回到测量状态。

These parameters can be examined but cannot be modified. If there is no key pressed continuously for 5 seconds, the instrument returns to the measuring state.

4. 修改参数的方法(见操作流程图中) Methods for modifying parameters (See Operation flowchart)

当仪器处于测量状态时,按下 \leftrightarrow 键大于 15 秒钟, 仪器 I 数码管右下角显示小数点, II 数码管显示提示符 C₁, 按 \leftrightarrow 键后显示 C₁ 的数值, 再按 \wedge/\vee 键可以修改 C₁ 的数值, 按下 \leftrightarrow 键进入下一个提示符 C₂, 再按下 \leftrightarrow 键显示 C₂ 的数值, 按 \wedge/\vee 键可以修改 C₂ 的数值, 依此类推.....

When the instrument is at the measuring state, hold Key \leftrightarrow for about 15 seconds, a decimal will be displayed at the bottom right corner of the Digital Tube I of the instrument and the indication symbol C₁ will be displayed on the Digital Tube II. Value of C₁ will be displayed after pressing Key \leftrightarrow , and value of C₁ can be modified by pressing Key \wedge and \vee . Press Key \leftrightarrow to enter the next indication symbol C₂. Press Key \leftrightarrow again, the instrument will display the value of C₂. Press Key \wedge and \vee , value of C₂ can be modified, and so on.

5. 手动风机的工作方法 Methods for manually operating the fan

仪器处于测量状态, 且温度低于 C₂ 时按 \vee 键则打开风机, 再按一次则停止风机。

When the instrument is at the measuring state and the temperature is less than C₂, press Key \vee to turn on the fan and press again to turn off it.

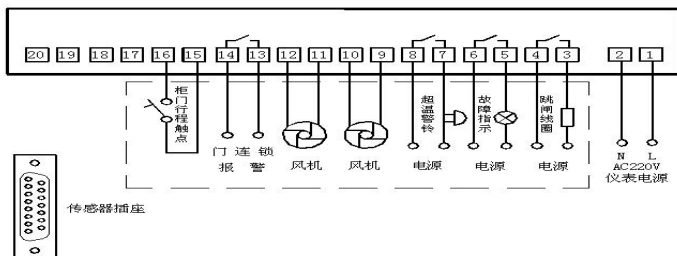
6. 选择显示方式 Select display mode

仪器处于测量状态, 按下 \wedge 键, 显示方式在巡回显示和最大值显示之间进行切换, 相应的巡回显示指示灯和最大值显示指示灯分别点亮。

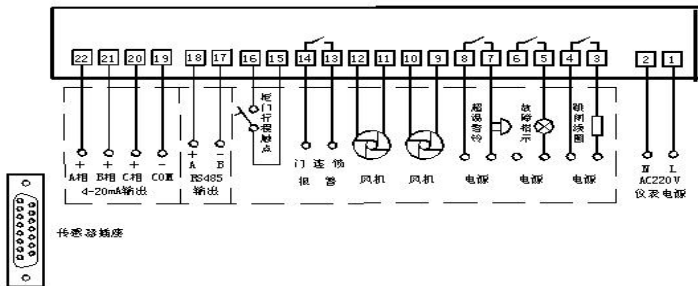
When the instrument is at the measuring state, press Key \wedge , the display mode will switch between the circuit and max. value modes. And the corresponding MAX. or Circuit light will be on.

六、仪表接线示意图 Model of instrument and wiring diagram

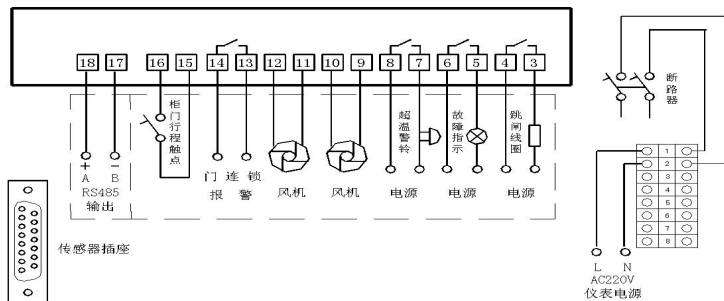
BWDK-T3207A



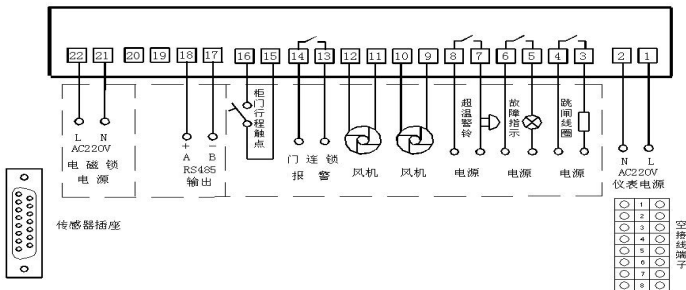
BWDK-T3208E (RS484) / BWDK-T3208B (4-20mA) / BWDK-T3208F (RS484, 4-20mA)



BWDK-T3207A-L / BWDK-T3208E-L (RS485)

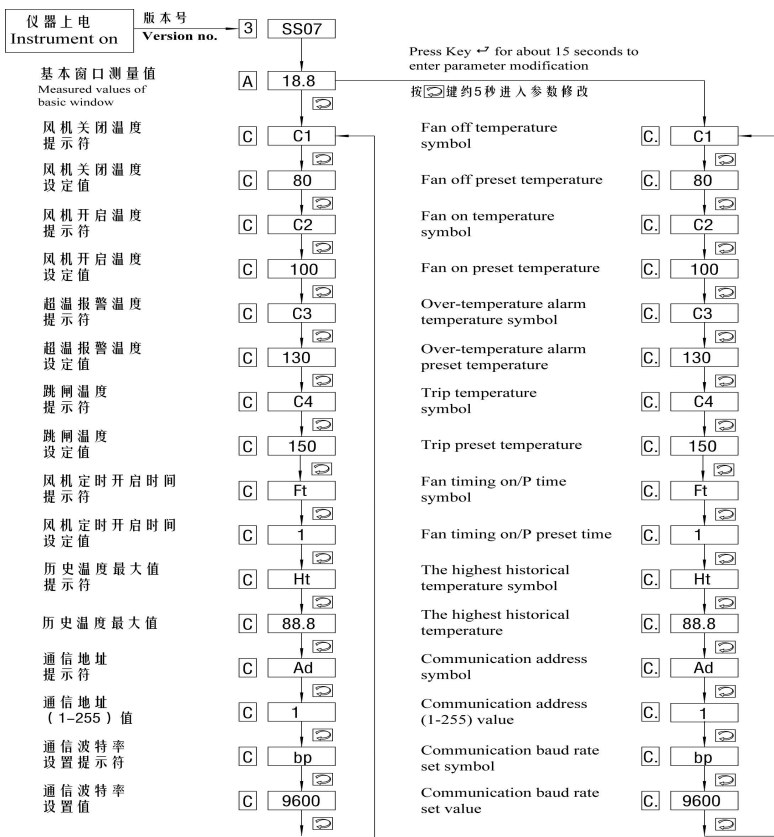


BWDK-T3207-M / BWDK-T3208E-M (RS485)



七、 操作流程图

Operation flowchart



1* 约5秒钟无任何键按下，仪器自动进入基本窗口。

* If there is no key pressed for about 5 seconds, the instrument will automatically enter basic window.

2* 修改参数时，用 \wedge / \vee 键进行加或减。

*Use Key \wedge and \vee to add and subtract when modify parameters.

地址：南京市定淮门 12 号熊猫软件园 15 栋东 1 楼

Address: ,Building 15,panda software park,12 dinghuaimen, Nanjing

联系人：彭永滨 电话：025-83345450 13605180030

Contact: Peng Yongbin Tel: 025-83345450 13605180030